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APPLICATION NUMBER: *60/560,184*
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This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
REJEAN	PLANTE	DRUMMONDVILLE, CANADA

Additional inventors are being named on the _____ *separately numbered sheets attached hereto*

TITLE OF THE INVENTION (500 characters max)

MULTIGROOVE FLOORING SYSTEM AND METHOD OF INSTALLING SAME

Direct all correspondence to: **CORRESPONDENCE ADDRESS**

☐ *Customer Number:*

OR

☑ Firm or Individual Name	INVENTARIUM				
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ENCLOSED APPLICATION PARTS *(check all that apply)*

☑ *Specification Number of Pages* 19

☑ Drawing(s) *Number of Sheets* 8

☐ Application Data Sheet. See 37 CFR 1.76

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[Page 1 of 2]

Respectfully submitted,

SIGNATURE _____

Date 04-06-2004

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Docket Number: _____

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Provisional patent application of

Réjean Plante for

Multigroove flooring system and method of installing same

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to flooring but more particularly to a floor having means for compensating for wood expansion and contraction.

Background

The prior art reveals many developments in wood floors or at least to floors that look like wood. Indeed, recent developments have proposed floor structures in which natural wood makes but a very small percentage of the content or none at all. A lot of substrates are made of wood based products mixed with various resins and polymers covered with a thin veneer of either natural wood or of melamine with a hard varnish finish. Because of problems related to the use of carpeting, mainly due to reported cases of allergies, wood floors or any such floor coverings made to look like wood have taken a greater share of the marketplace. Also, wood or wood looking finishes can be used on walls and even ceilings.

Besides the combination of materials used, means for securing floor planks or strips (strips referreing generally to pieces of flooring 4.5 in or less while planks refer to wider pieces of flooring) on top of a subfloor have been developped as well as means for securing the floor's individual planks or strips together as a whole. For example: Although most floor strips or planks are profiled in "tongue and groove" fashion, some are "groove and groove" and use a spline to replace the tongue in order to bridge two adjacent planks or strips together so that they are evened up. Alternatively a system of clips fastened to the sub floor engages the grooves in order to secure the planks or strips onto the subfloor.

Due to wood's hygroscopic nature, variations in relative humidity makes it expand or shrink. This means that when wood is exposed to air, it will either dry out or pick up moisture and moisture absorption causes wood to expand until the fibers are saturated, which occurs when the moisture content (MC) of wood reaches 25-30%, beyond that, wood no longer expands.

So, as the wood expands, the floor strips or planks grow wider and longer and, inversely, when the MC drops, the floor strips or planks will shrink in width and also in length.

It should be noted that most of the wood expansion and shrinkage occurs perpendicularly to the direction of the wood fibers (the grain) and since virtually all traditional wood floors have the wood fibers aligned along the length of the strip or

plank, most of the expansion will occur along the width. For any given length a piece of wood will expand or shrink by 0.1% of its length.

If the floor was installed when its MC was higher than the NOFMA recommended industry rating, each plank will start to reduce its moisture content in order to acclimate itself to the relative humidity of the building. Shrinkage will cause gaps between the floor strips or planks. Over time, these gaps can become filled with dirt and grime which can host germs or even microorganisms which can attack wood fibers since the sides of floor strips or planks are not varnished or sealed in any way like the top finished face is. Introducing moisture into the side of the strips or planks will cause a localized swelling of the sides of the strips or planks. If moisture remains for too long a period, eventually the whole plank or strip will expand. If there is too much dirt or grime it can even impede any possibility of expansion which will force the strips or planks to either cup, crown or sustain severe deformation which could result in either major resurfacing or even replacement of the entire floor, which is costly and should preferably be avoided.

In order to reduce the formation of such gaps in today's floor installations, various means to try to control expansions and contractions have been invented. One such means comprises a top layer, a bottom layer and a core layer sandwiched in between and which is made up of a series of transverse lattes. Since the wood grain of those lattes is set transverse to the wood grain of the other layer(s) it will help reduce the expansion and contraction along the width.

The wider a plank of solid wood is, the higher the risk that it will warp along its width. Either in a convex manner or in a concave manner. This is why planks of solid wood are rarely wider than 5 in. To overcome that limitation, multi-ply floors made of crossed grain glued layers were developed because they are less prone to warping and can therefore come in much wider width which are finished with a veneer made to look like hardwood strips or planks. Another way is to glue a veneer on top of a core made of a composite material. The latter has more variations in both its length and width since the wood fibers do not have any particular direction and that is why it is preferably installed "floating" so that the entire floor surface can expand and contract at will. This has the inconvenience of requiring an expansion joint which needs to be covered. This expansion joint cover is genereally very apparent and not very esthetically pleasing. Moreover, since it is installed with an overlap covering the top of the floor it cannot be level with the floor and creates an unnecesary "threshold" appearance.

To prevent curling lengthwise, this curling often referred to as "ski warp" or "barrel curl" or even "banana curl", cross grain lattes spaced apart at the bottom of a strip or plank of wood are used. This can also allow a strip or plank to follow small unevenness in the subfloor.

Because of the complexity of wood, there is no wood or simulated wood flooring system today which can solve all the problems and there is therefore a need for an improved flooring system.

SUMMARY OF THE INVENTION

It is a first object of this invention to provide for a flooring system which can compensate for the expansion and contraction of wood used for flooring purposes.

It is a second object of this invention to provide for a flooring system having a decorative element to enhance the look of flooring.

It is a third object of this invention to provide for a flooring system that does not require a traditional expansion joint cover.

It is a fourth object of this invention to provide for a flooring system that reduces consumption of wood by having a groove and groove profile.

It is a fifth object of this invention to provide for a flooring system that provides for a faster and more economical installation.

It is a sixth object of this invention to provide for a method of installation for floors.

It is an seventh object of this invention to provide for a floor having cross grain on the top apparent surface.

For the sake of simplicity, in the following discussion, the term wood plank will describe both strips and planks.

In order for the flooring system of the present invention to provide the above objects, it uses a combination of features which work with the expansion/contraction naturally occuring when wood is subjected to moisture variations. Part of the process is taken within the plank, which is the intraplank compensation and another part is taken by interacting between the planks which is the interplank compensation.

In order to do so, the present invention consists of either solid wood planks or of multi-ply, engineered, of MDF or HDF planks that are cut so that they have either the tongue and groove profile of typical wood floors or an innovative "groove on all sides" profile and a special surface groove as well as a system of grooves placed in the core, inner core or anywhere within the plank to give it a spring like expansion and contraction.

By being able to work with for the expansion / contraction, it is possible to create planks that are much wider than usually done in the industry which makes it possible for an installer to install a floor much faster since fewer pieces are needed to cover a given surface.

The foregoing and other objects, features, and advantages of this invention will become more readily apparent from the following detailed description of a preferred embodiment with reference to the accompanying drawings, wherein the preferred embodiment of the invention is shown and described, by way of examples. As will be realized, the invention is capable of other and different embodiments, and its several

details are capable of modifications in various obvious respects, all without departing from the invention. Accordingly, the drawings and description are to be regarded as illustrative in nature, and not as restrictive.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig.1 Omitted

FIG. 2ab Perspective views showing the laying of a floor using interplank spacing with spacers.

FIG. 3a Perspective view of groove and groove profile, hardwood, with two type of splines.

FIG. 3b Perspective view of groove and groove profile, multi-ply, with two type of splines.

FIG. 3c Perspective view of groove and groove profile, MDF/HDF with two type of splines.

FIG. 3d Perspective view of a floating key lock joint.

FIG. 3e Perspective view of a floating key lock joint and special substance.

FIG. 3f Perspective view of a key lock joint of the prior art.

FIG. 4ab Perspective view of prior art regarding pushing out of nailings.

FIG. 5ab Perspective view of prior art hardwood floor.

FIG. 6ab Perspective view of multigroove system.

FIG. 7, 8ab Variations of multigroove system with interplank..

FIG. 9, 10 Perspective view of multi-ply floor with spring system and cross grain groove applicable lengthwise and crosswise.

FIG. 11 Perspective view of close grouping.

FIG. 12 Perspective view of cross grain planks.

FIG. 13 Plan view of insert.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 2ab By providing an interplank spacing (50) between each plank (52), each plank (52) is allowed to expand. The spacing depends on a variety of factors such as the nature of the plank (essence of the wood), wether it is of a single piece hardwood, multi-ply, engineered, MDF, HDF or otherwise. Once a spacing is determined from the manufacturer's specs which are based on the specification of the type of floor installed, moisture content, as well as the typical humidity content of the geographical location the floor is to be installed, installation can proceed. When installing, a proper spacer tool (104, 106, 108) will set the recommended spacing and insure that each plank is set parallel to the next. In order to maintain parallelism, it is preferable, when nailing, stapling or gluing, that all spacer tools (104, 106, 108) be in line one behind the other for several rows of planks as per **Fig. 2b**. Spacing between planks (52) has to be at least over twice the expansion of a plank (52) so that a special substance (60) **(FIG. 3)** can take the expansion. Back to the spacer tool (104), since it is not a true square angle, squeezing it between planks (52) lifts the long flat piece (110) when the appropriate spacing is obtained. To insure parallelism, a minimum of two spacers (104, 106, 108) are required. Both spacers (104) and (106) have grab holes (114) to remove them after use except that spacer (104) has an extension (112) to receive the grab hole (114).

Referring generally to **FIGS. 3,** in the case of a groove and groove profile, a spline is used to bridge each individual plank (52). In the case of a "T" spline (56) the advantage of such a configuration is that it allows for nails (46) or staples (48) to be inserted vertically right through the leg (58) as well as the usual diagonal insertion. The "T" spline (56) can be made of any type of material or combination of materials judged appropriate for the use and can be used for all groove and groove materials such as hardwood, multi-ply, engineered, MDF, HDF or any other such types.

When a first plank (52) is laid, the "T" spline (56) follows by being inserted into a groove (72) until the leg (58) of the "T" spline (56) abutts against the side of the first plank (52), and then a second plank is put in place against the "T" spline (56), and the sequence continues. The spacing set between planks (52, 52') also creates a spacing around the "T" spline (56) so that it will not interfere with the expansion of the plank (52'). Also, the "T" spline (56), being assymetric, has a longer side to allow for a greater interplank spacing. Other types of splines are the finger spline (56') and the plain spline (56").

Once all the planks (52) are in place, a special substance (60) is applied into the spacing (50) to seal it. The special substance (60) that is currently available on the market for other uses not related to flooring consists of a combination of products which allow the special substance (60) to stretch or compress up to 50% of its size. The special substance (60) can vary its specs by varying its chemistry so that higher or lower percentages of stretch can be achieved and does not contaminate varnishes, it is hydrophobic, will stick permanently to wood during expansion/compression cycles

and has a number of other features which makes it ideal for use as interplank filler. It can be transparent or have a matching color to the wood or can have a contrasting color or even be matched to the color of the walls and can open new possibilities for interior decorators. It is easy to remove the product if one would like to change the color or else, after sanding and revarnishing the floor, in which case the new special substance (60) would be inserted after the varnishing is completed. The sealing properties of the special substance (60) makes the joint totally impervious to moisture or water infiltration at the edges of the plank (52), a source of swelling for wood, and also impedes the accumulation of dirt and grime, thus making the interplank spacing (50) totally sanitary. Moreover, the plank (52) is in no way restricted in its expansion or contraction by the presence of the special substance (60) and no moisture or water is allowed to enter the side of the plank (52) where no varnish is present and affect it

As an alternative, a floating lock joint (62) can be used instead as long as its complementary lock (64) is wide enough to allow for expansion contraction displacements. This type of floor can be stapled, nailed or left floating.

Also, the special substance (60) can be used on any prior art floor such as in a lock joint of the prior art (200) (**Figs. 3ef**) lock joints or the improved expansive key lock joint of **Fig. 3d**, to seal in between planks (52, 52') in order to stop moisture infiltration -- a cause of swelling. For all floors on which it is to be used, there are three ways by which the special substance (60) can be applied :

During the manufacturing process.

During the floor installation in the shape of a roll which is applied as long strips.

By direct application into the spacing once the floor has been installed.
In all cases, it is preferable that the special substance (60) take in a concave shape such as a "V" so that it is never higher than the surface of the floor and dust and sand can be pushed in so that it will minimize potential scratching of the floor surface.

FIG. 4ab It is important to understand that if a plank (52) has no room for expansion, the wood will expand by way of least resistance. In these before and after view of a prior art floor, if during expansion wood encounters resistance from a nail (46) or staple (48) to the left, it will expand to the right where the nail (46) or staple (48), generally inserted at an angle, will be lifted. Once lifted, a nail (46) or staple (48) won't come back to its original position and the floor becomes an unintentional "floating floor" which is subject to cupping, warping and squeaking.

FIG. 5ab The prior art has hardwood planks (66) having a top finished face (68), a tongue (70) and a groove (72) and a series of underside grooves (74) on the bottom face (76). The side edges (78, 78') can be square as in **Fig. 5a** or half-beveled (80, 80') in any shape or size as in **Fig. 5b** .

FIG. 6a For an improved compensation of the expansion contraction, a flooring system plank known as multigroove system (82) has most of the same elements as the hardwood planks (66) of the prior art but can be made to look like two strips side by side by having a top groove (84) set in its middle which is preferably, but not necessarily, shaped to look like two half-beveled side edges (80,80') put together. In vertical aligment with the top groove (84) is a bottom groove (86).

Each multigroove system (82) is designed to handle its part of the expansion contraction variations as opposed to the prior art hardwood planks (66), most notably "free floating" floor systems where the entire floor surface expands or contracts and spacings of the order of 1/2 inch or more have to be made around the perimeter of the room to take in the expansion and an expansion joint trim has to be put at every twenty feet or so, depending upon the specification of the floor, to take in the expansion, both lengthwise and widthwise. One problem with having the entire floor surface taking in the expansion or contraction is that if an object, such as a heavy piece of furniture, blocks a section of floor from sliding with the expansion or contraction, there is an uneven deformation in the floor since expansion on either side of that blockage is impeded.

But, if each multigroove system (82) is responsible for its share of the expansion or contraction, whatever impediment would be strictly isolated. In laying down each multigroove system (82) part of the expansion is taken within the plank (52) which is the "intraplank" expansion and when care is taken to have a proper spacing between each multigroove system (82) as described in **FIGS. 3,** this takes care of the "interplank" expansion and contraction.

Other factors can also affect prior art hardwood planks (66), such as when a plywood subfloor becomes unduly wet in spots for any reason (rain, snow, etc) prior to installation of the floor which will cause the prior art hardwood planks (66) to absorb that excess moisture when it is first laid. Since there is no spacing and no

compensation means, each prior art hardwood planks (66), expands, which creates cupping on the floor surface but more importantly, when the plywood of the subfloor loses its moisture, it shrinks and displaces prior art hardwood planks (66), in an uneven fashion since moisture level may not be spread evenly across the subfloor. When, however, each multigroove system (82) compensates by combining the features of intraplank and interplank compensations, the effect is localized and is not felt throughout the floor.

FIG. 6b More particularly for this variation of the multigroove system (82), the top groove (84') is made deeper and there is no equivalent bottom groove (86) but rather a series of deep cut underside grooves (86). A blend of various groove depths, widths and shapes aligned or not can be mixed depending upon the result desired. Whatever the variations, whether as in **Fig. 7** or **Fig. 8,** where the look of three planks can be simulated, if nails or staples are desired, they can be hidden in the bottom of the top groove (84, 84'). This prevents the multigroove system (82) from crowning since any expansion of the wood by moisture absorption at or near the bottom of the multigroove system (82) will be taken in by the voids of the bottom grooves (86). In other words, the multigroove system (82), because it has its top groove (84, 84') has a weak point which doesn't give it enough strength to cup, at least not enough strength to go against nails or staples. It does not have a tendency to crown either because the top groove (84, 84') gives the wood room to expand.

FIGS. 9, 10 These multi-ply floors (88) also have a top groove (84) but also have a cross top groove (90) and cross bottom grooves (92) which handles expansion

lengthwise . Deep bottom grooves (86) in **Fig. 9** and one deep bottom groove (86) in **Fig. 10** handle cupping and crowning. And likewise for the cross bottom grooves (92) and the top grooves (90) where warping along the length can be an issue. Another advantage of these multi-ply floors (88) is that the close groupings (94) of these bottom grooves (86) with the top groove (84) creates a spring like flexibility to the multi-ply floor (88). Spacing between bottom grooves (86) and the top groove (84) is important and is determined by the type of wood -- or in the case of engineered floor, any other material -- used in order to obtain the right amount of flex. These principles can be applied to any type of flooring, engineered, multi-ply, hardwood, MDF, HDF, etc... Also, the special substance (60) can be applied to the long sides of the planks (52) only or across the width as well.

When there are three closely spaced grooves in a grouping (94) there is twice the amount of spring as when there are only two closely spaced grooves in a grouping (96).

As can be seen in **FIG. 11,** there can be several close groupings (96) across the width of a multi-ply floor (88) and most are confined within the inner core (98) except for grouping (100) which has a bottom groove (86) and grouping (102) which has a top groove (84) in combination, a grouping can have the entire thickness of the plank. The depth of the various grooves can also vary between groupings and within groupings so does the width and shape and alignment. Similar cuts can also be done on hardwood with no ply but when using this type of multi-ply floor (88), it can further reduce its natural expansion tendency by having cross grain plies (116) as per **FIG. 12** which

restrict expansion across the width since expansion of wood along the length of the grain is only 0.1% or width expansion. By having the cross grain ply on the top finished surface, a very different look to each plank can be had.

FIG. 13 In any situation where there is expansion of wood, the special substance (60) can be used. For example, when laying down an insert (120) in a floor (40), expansion could cause a deformation, even damage to the insert (120) but by having a spacing (50) around the perimeter of the insert (120) and filling it with the special substance (60), the problem is solved.

Because of the versatility of the system described herein, whenever a reference to prior art hardwood planks (66) was made, it covered wood floors in general even if their content in real wood is very low or non existent, it is just a generic term to simplify description.

CLAIMS

1. (Omitted)

2. A flooring system comprising :

an interplank spacing between each plank;

said interplank spacing filled with a special substance;

said special substance being applied

- during manufacturing process
- during installation as a roll applied as long strips
- direct application into the spacing after installation

a spacer tool to obtain the appropriate said interplank spacing;

said spacer tool having a means for indicating when the appropriate said interplank spacing is obtained;

in combination of two or more of the said spacers, parallelism between each said plank is obtained;

said special substance being applicable to prior art floors to prevent swelling including but not limited to use on lock joint floors.

3. A flooring system comprising :

intraplank means;

said means comprising a multigroove flooring system;

said multigroove flooring system comprising;

at least one top groove;

4. A flooring system comprising :

intraplank means;

said means comprising a multigroove flooring system;

said multigroove flooring system comprising;

at least one top groove;

at least one bottom groove;

5. A flooring system comprising :

a) intraplank means;

said means comprising a multigroove flooring system;

said multigroove flooring system comprising;

at least one top groove;

preferably but not necessarily at least one bottom groove;

a blend of various groove depths, widths and shapes aligned or not;

b) groupings of two or groupings of three grooves with groupings in the inner core;

groupings in the core;

groupings across the entire thickness of the plank;

c) cross top grooves;

cross bottom grooves;

cross groupings of two or three grooves with groupings in the inner core;

groupings in the core;

groupings across the entire thickness of the plank;

d) said groupings and said cross top groupings further comprised of a combination of thickness, width, shapes, alignment and spacing between grooves of each group to provide a desired « spring like flexibility»;

spacing between each groupings to provide a desired « springlike flexibility »;

6. A flooring system with interplank spacing comprising :

planks having a groove groove profile;

said groove groove profile using splines;

said splines being any of;

- « T » spline
- finger spline
- plain spline

said « T » spline or said finger spline being symmetric or assymetric in relation to a leg or a finger as the case may be;

said assymetric splines being longer to cover a wide range of the said interplank spacing.

7. A flooring system with interplank spacing and intraplank comprising :

planks having a groove groove profile;

said groove groove profile using splines;

said splines being any of;

- « T » spline
- finger spline
- plain spline

said « T » spline or said finger spline being symmetric or assymetric in relation to a leg or a finger as the case may be;

said assymetric splines being longer to cover a wide range of the said interplank spacing.

8. (Omitted)

9. (Omitted)

10. Inserts having the following method of installation:

establishing a spacing around the perimeter of the insert to be inserted, filling said spacing the special substance of claim 2.

11. A cross grain plank comprising:

cross grain on the top finished surface in combination with interplank features of claim 2 and intraplank features of claims 3, 4, 5 and 7.

FIG.2

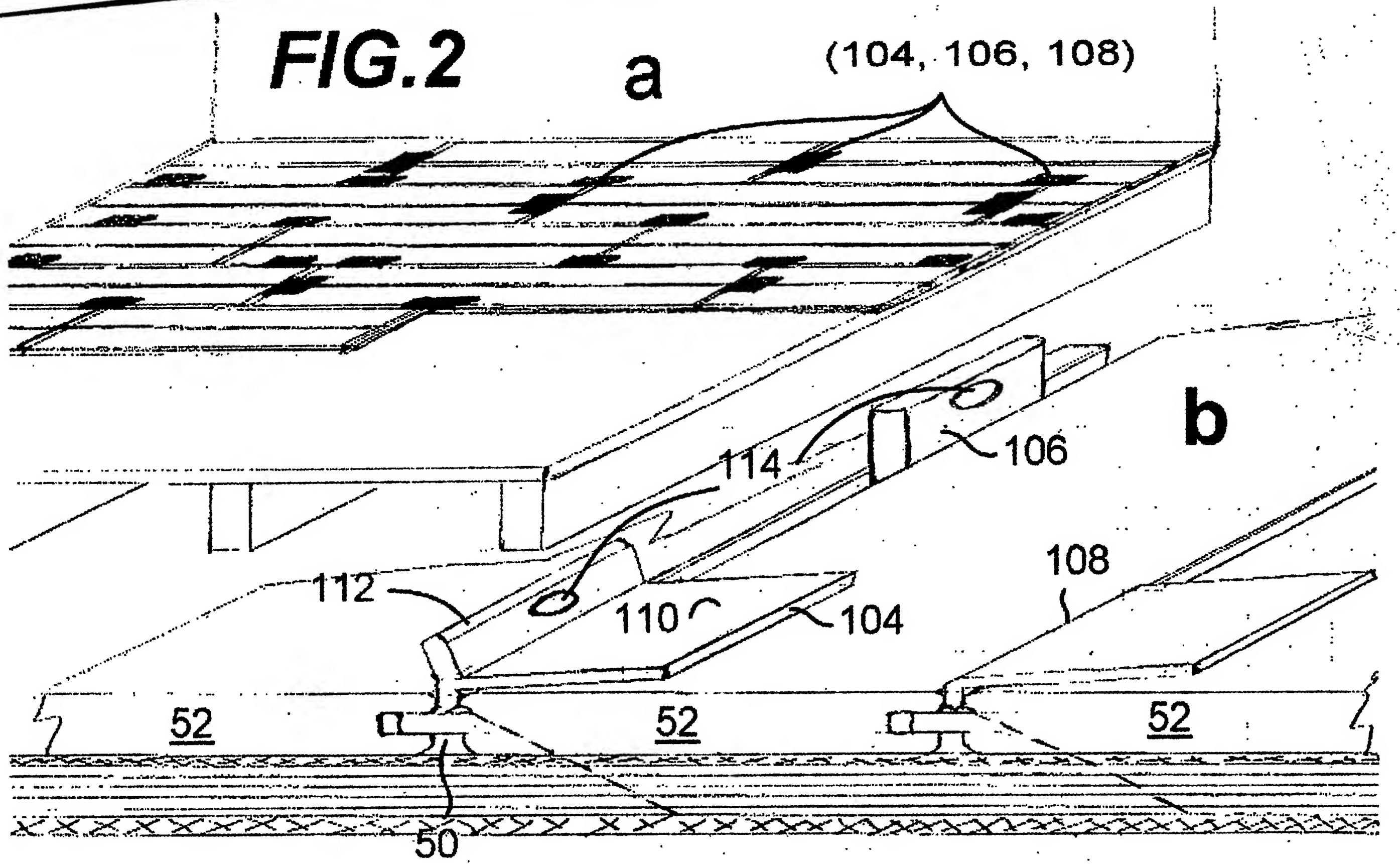


FIG.3

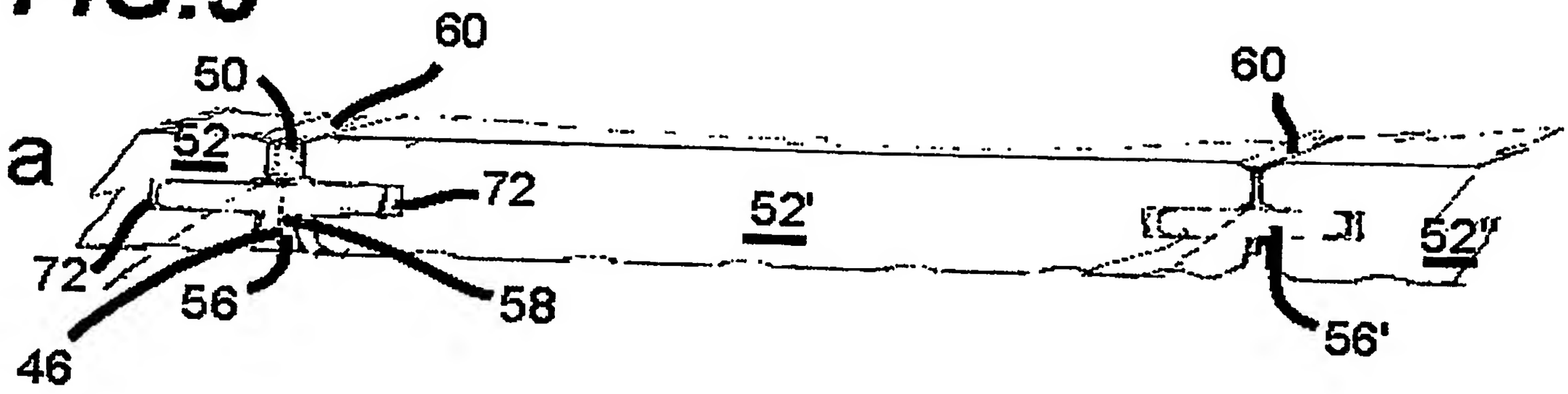
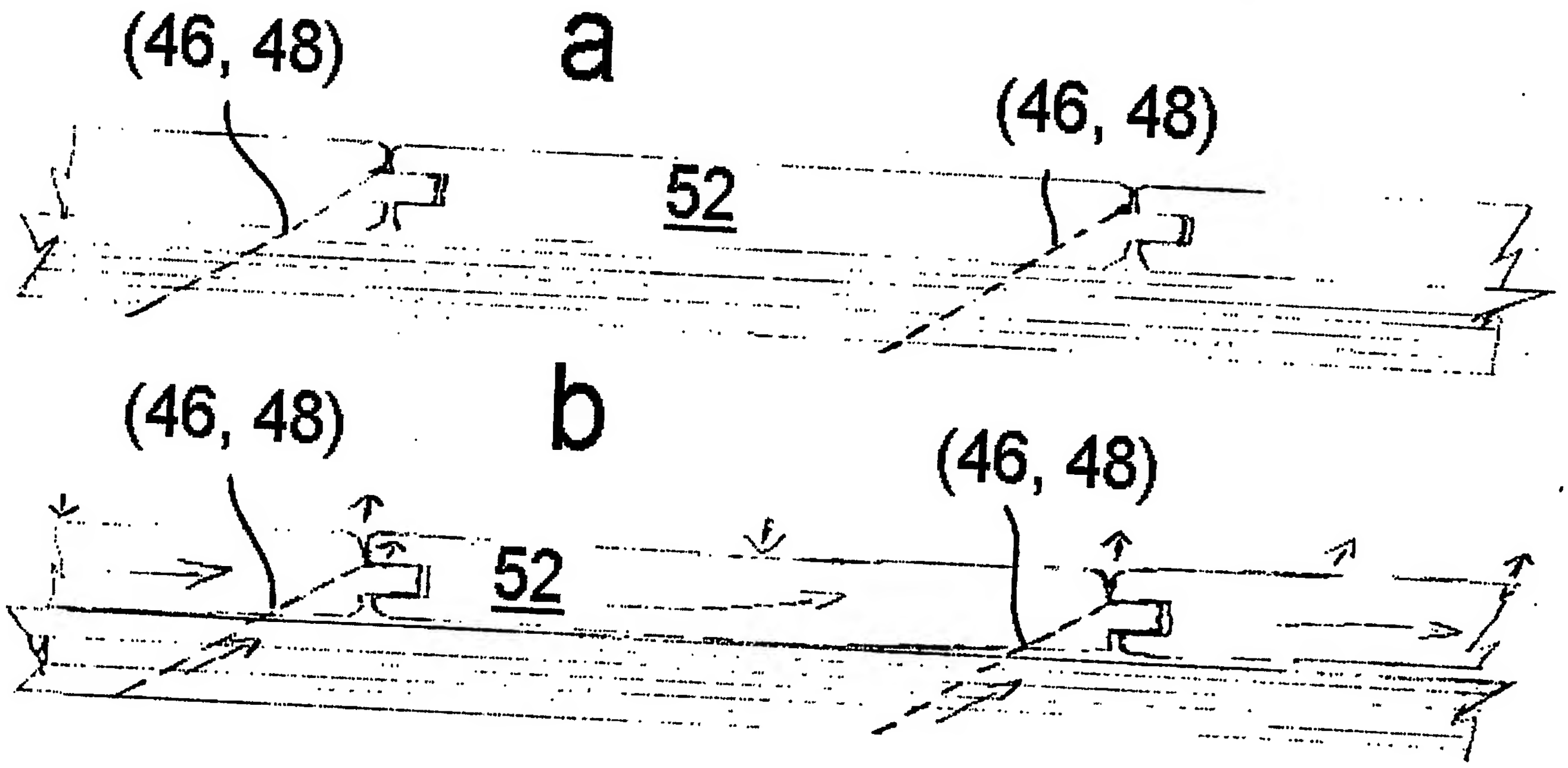


FIG. 4



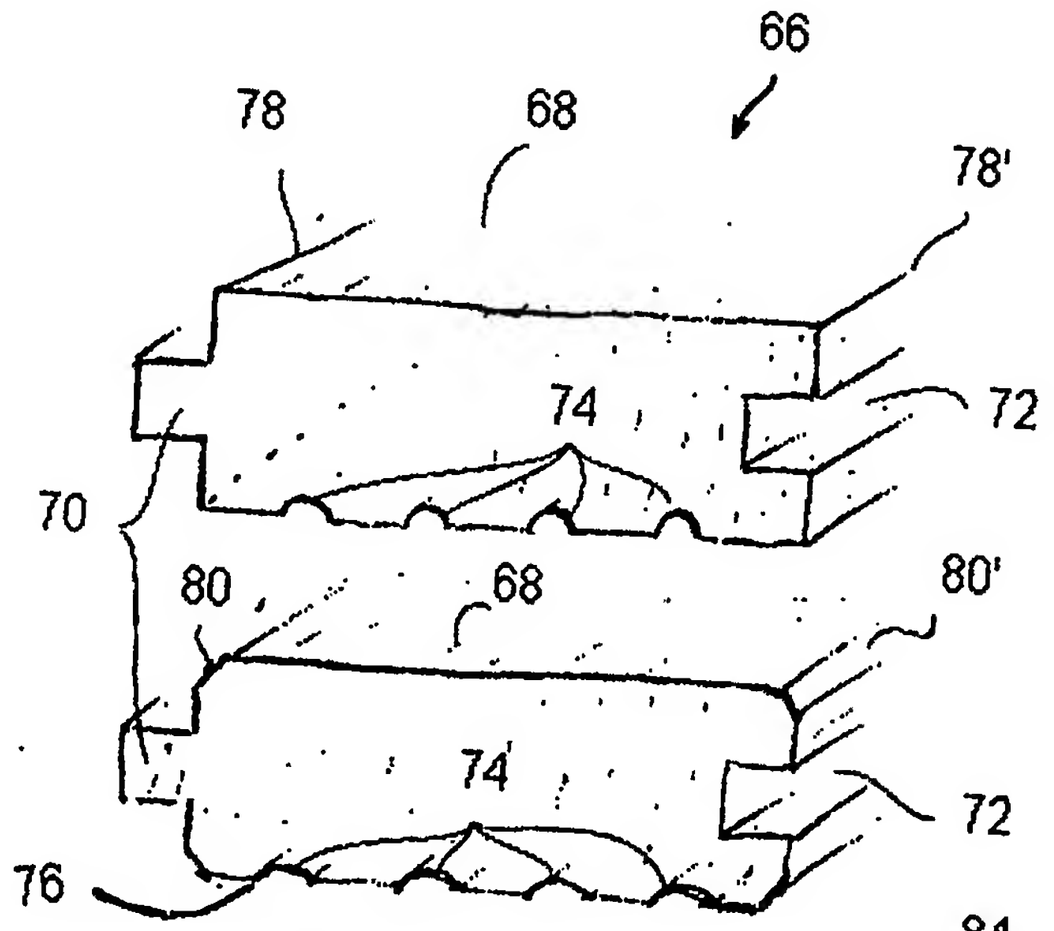


FIG. 5a

b

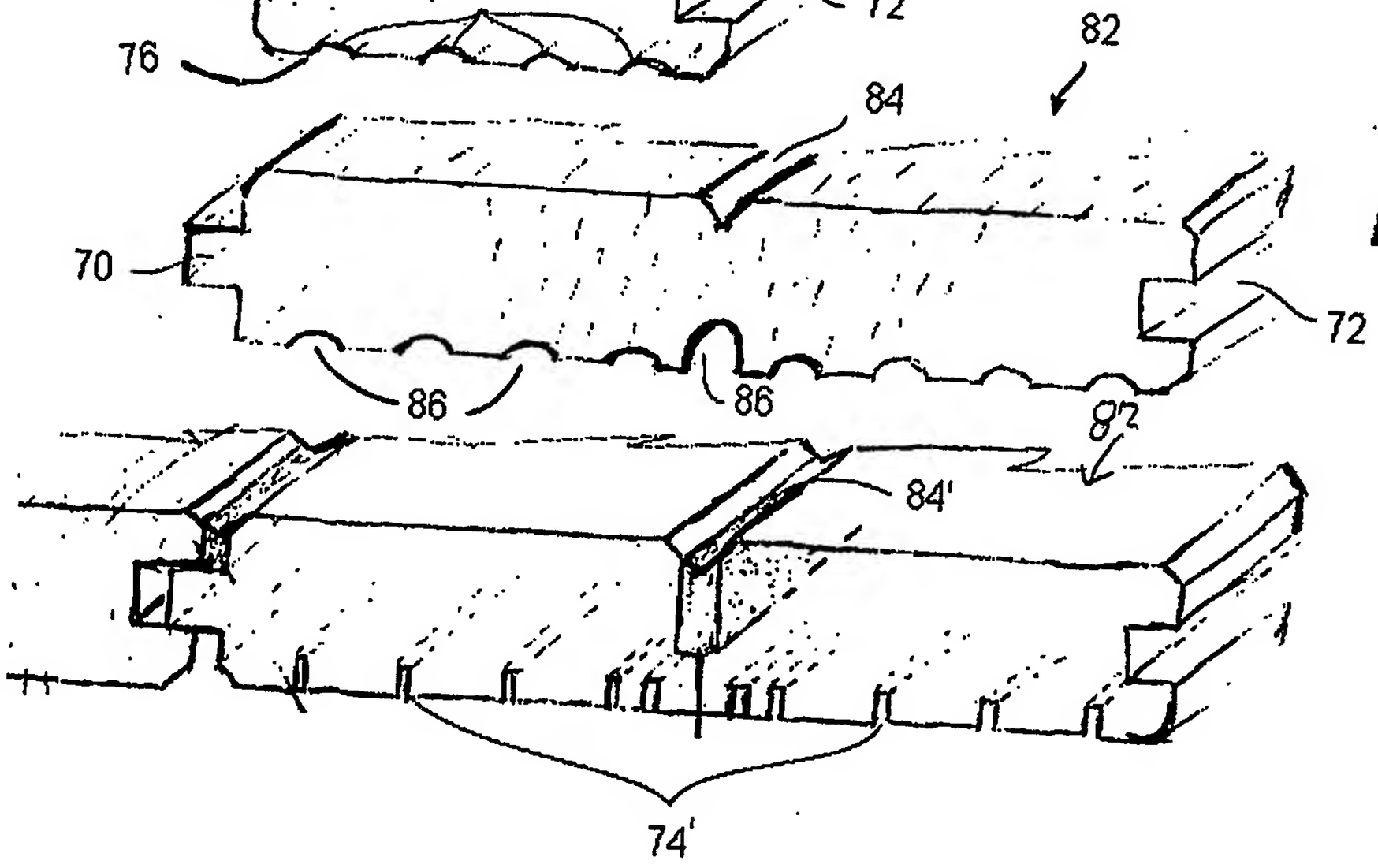


FIG. 6a

b

FIG. 7

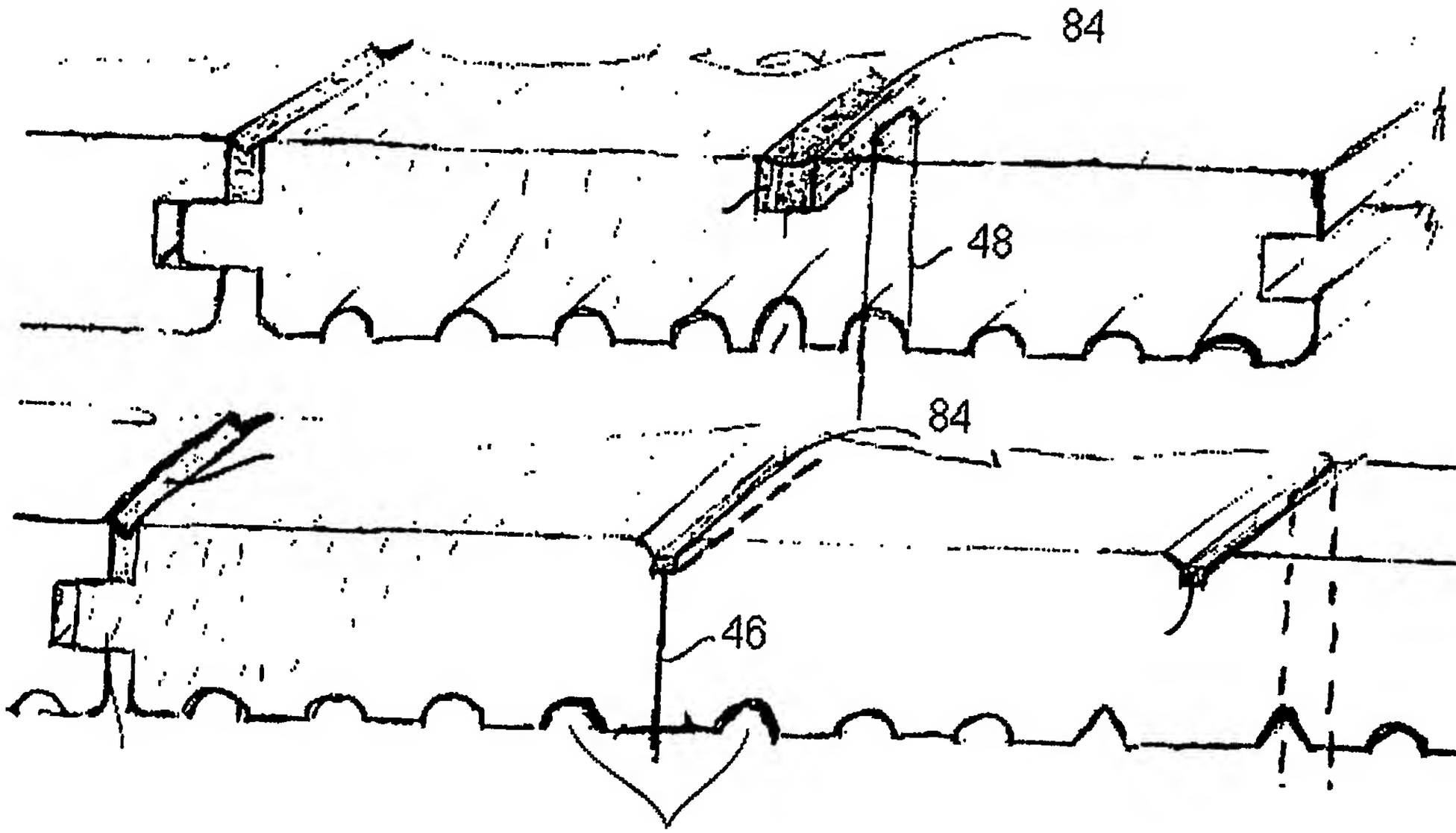
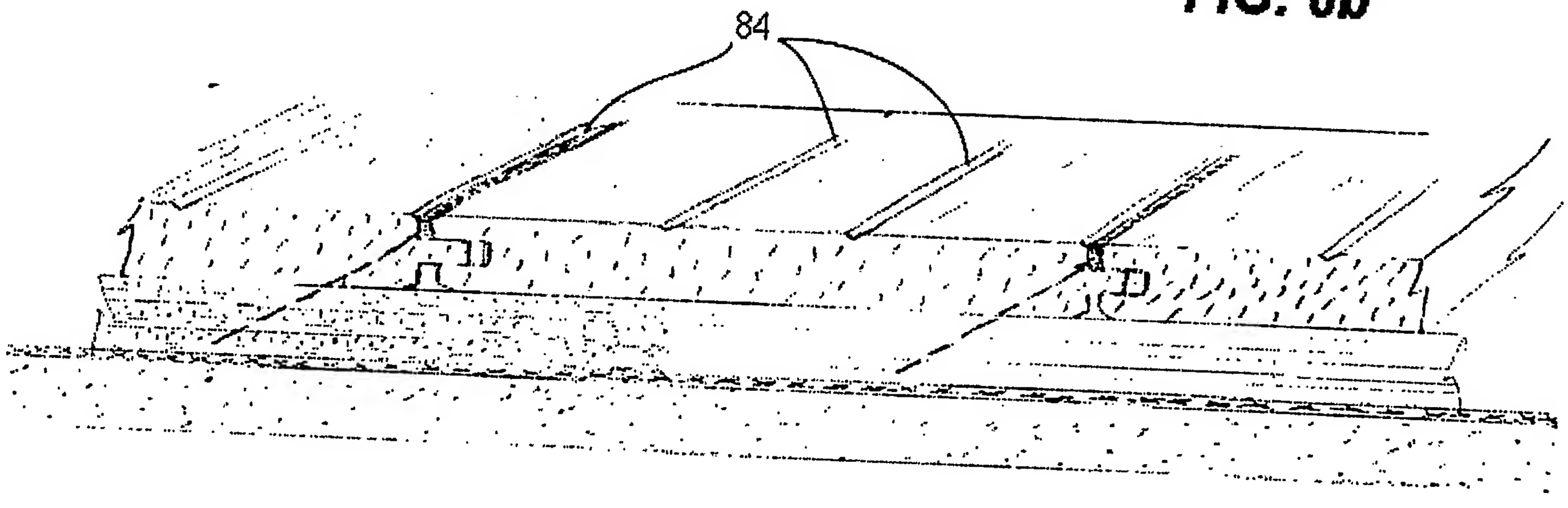


FIG. 8a

FIG. 8b



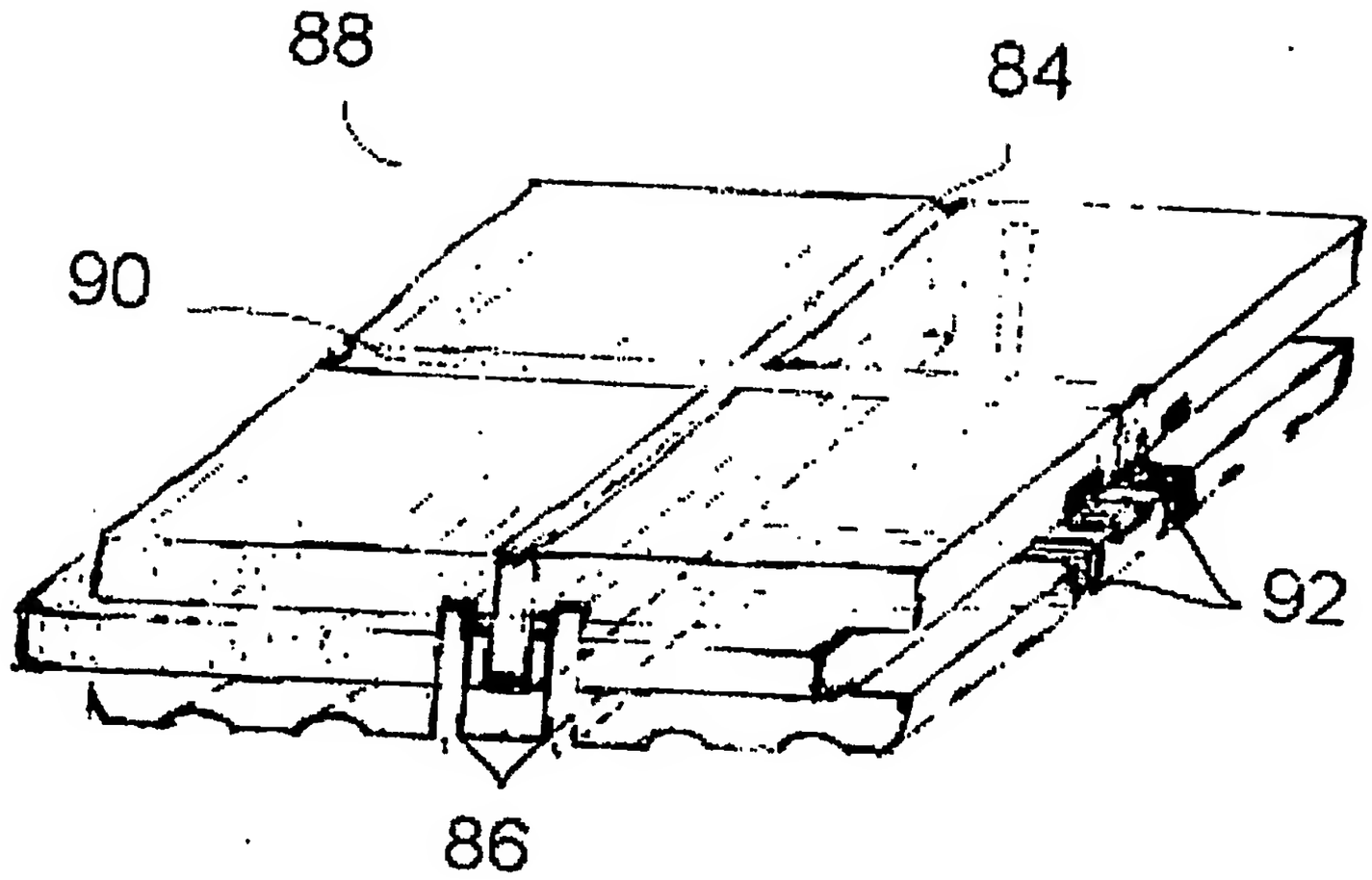


FIG. 9

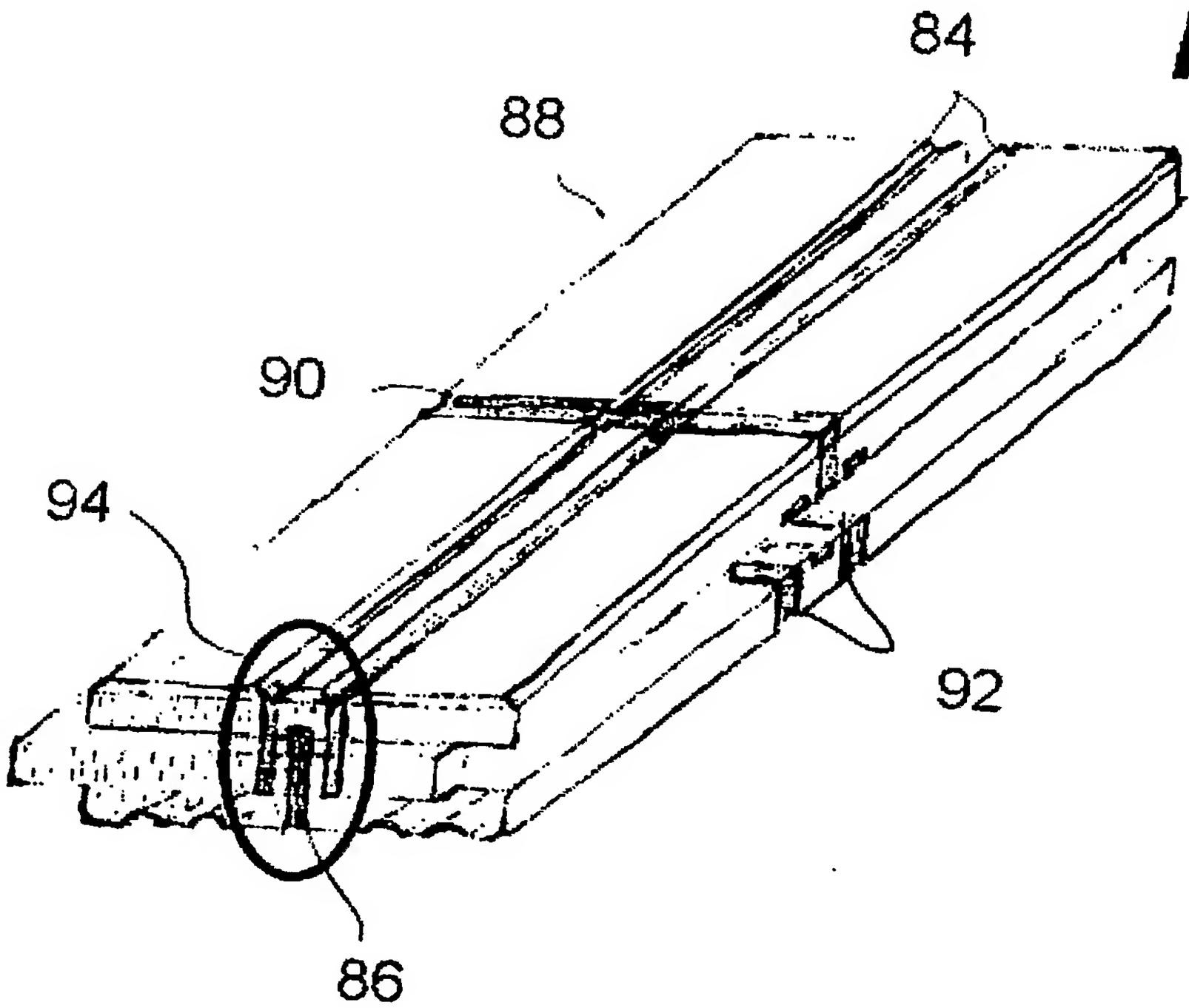


FIG. 10

FIG. 11

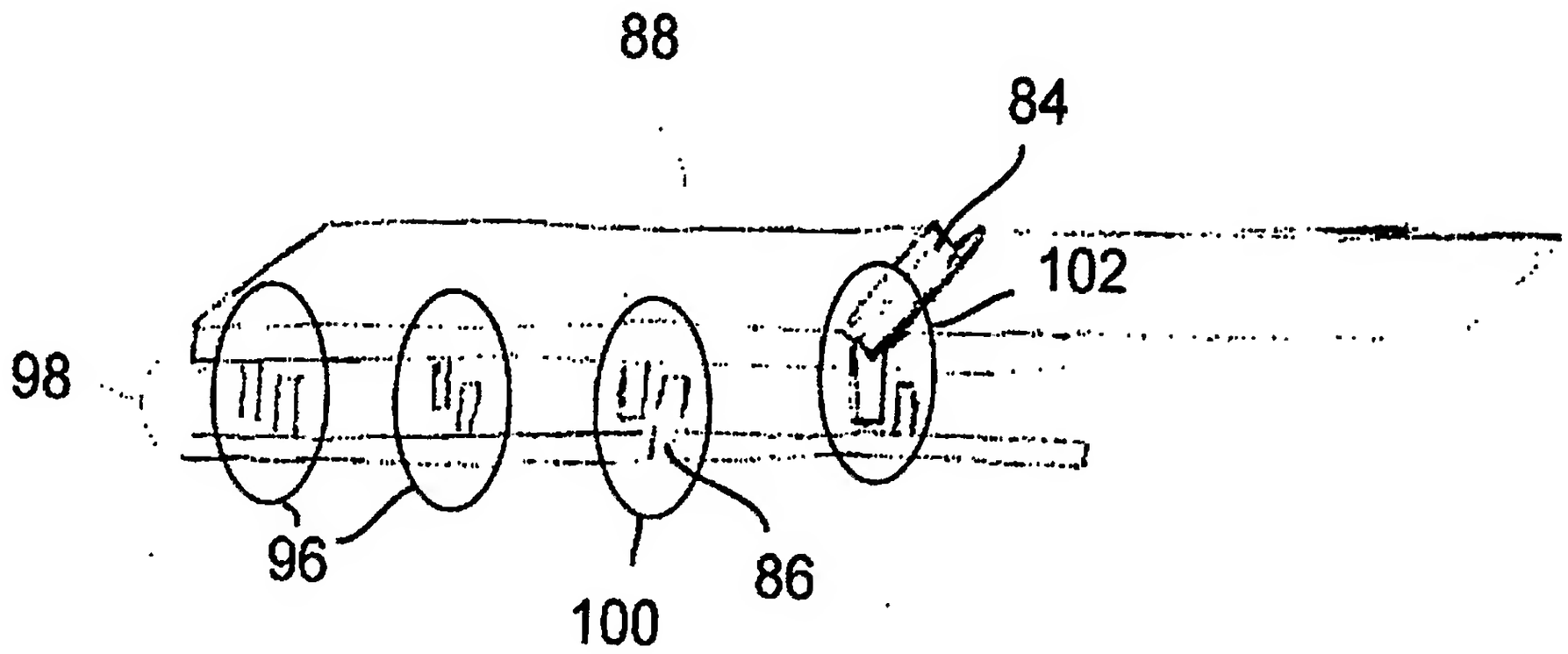


FIG. 12

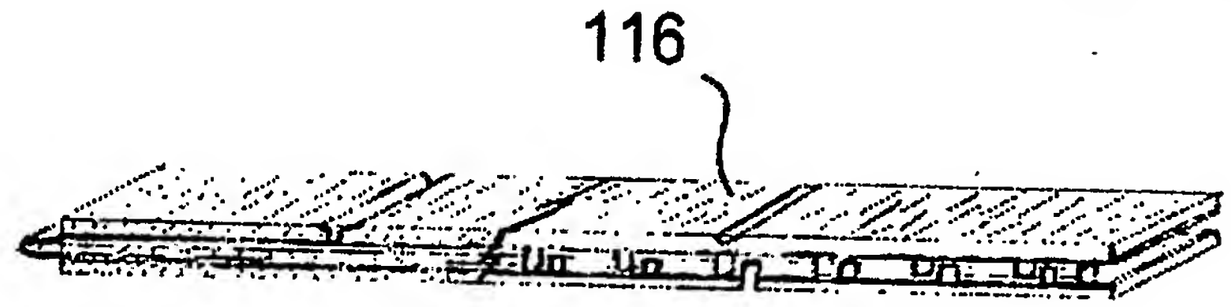


FIG. 13